

## AMENDMENTS TO THE CLAIMS

1. (Currently Amended) ~~Device~~ A device for detecting by photoexcitation, a chemical element in a host substance, comprising:
  - an optical excitation source consisting of a semiconductor laser, emitting in the direction of a sample of said substance ~~sample~~, a light beam whereof the wavelength, located in the mid infrared, corresponds to an absorption band specific of said element; and
  - ~~the~~ a means for detecting and measuring the heating effects of ~~the host~~ said substance, resulting from the interaction of the element molecules excited by said beam with said host substance molecules,wherein ~~characterized in that the~~ said source of excitation is a quantum cascade laser.
2. (Currently Amended) ~~A device~~ A device according to claim 1, wherein ~~characterized in that the~~ said means for detecting and measuring, ~~respond~~ responds to the pressure wave generated by heating ~~the host~~ said substance, to produce a representation of the concentration of said element in said substance.
3. (Currently Amended) ~~A device~~ A device according to claim 2, wherein ~~characterized in that the~~ said means for detecting and measuring ~~comprise~~ comprises a microphone.
4. (Currently Amended) ~~A device~~ A device according to claim 2, wherein ~~characterized in that the~~ said means for detecting and measuring ~~respond~~ responds to the variation in the index of refraction of ~~the host~~ said substance, due to the pressure wave generated by the heating thereof, in order to produce a

representation of the concentration of said element in said substance.

5. (Currently Amended) A device ~~Device~~ according to claim 4, wherein ~~characterized in that the~~ said means for detecting and measuring ~~comprise~~ comprises a source of light emitting a sounding beam, which crosses said sample and ~~the~~ a means of measuring the deflection of said sounding beam, which results from the change in refraction index of ~~the host~~ said substance.
6. (Currently Amended) A device ~~Device~~ according to claim 1, wherein ~~characterized in that~~ said means for detecting and measuring ~~respond~~ responds to the variation in the index of refraction of ~~the host~~ said substance, resulting from the heating thereof, to produce a representation of the concentration of said element in said substance.
7. (Currently Amended) A device ~~Device~~ according to claim 6, wherein ~~characterized in that the~~ said means for detecting and measuring ~~comprise~~ comprises a source of light emitting a sounding beam which crosses said sample in a co-linear manner in relation to the ~~excitation~~ light beam and also ~~comprise~~ comprises a means ~~of~~ for measuring the enlargement of the sounding beam resulting from the change in the refraction index of ~~the host~~ said substance.
8. (Currently Amended) A device ~~Device~~ according to claim 1, ~~characterized in that it also comprises~~ further comprising an enclosure to receive said sample.

9. (Currently Amended) A device ~~Device~~ according to claim 8, wherein  
~~characterized in that~~ the enclosure is smaller than the  
acoustic wavelength at ~~excitation~~ working frequency.
10. (Currently Amended) A device ~~Device~~ according to claim 8, wherein  
~~characterised in that~~ the enclosure is of such dimension as to  
accommodate the acoustic modes resonating at ~~excitation~~  
working frequency.
11. (Currently Amended) A device ~~Device~~ for detecting by photoexcitation, a  
chemical element in a host substance comprising:
- a source of optical excitation consisting of a semi-conductor laser which, in the direction of ~~the~~ a sample of said substance, emits a beam of light, the wavelength of which, located in the mid infrared, corresponds to an absorption band specific to said element; and
  - ~~the~~ a means for detecting and measuring the heating effects of ~~the host~~ said substance, resulting from the interaction of the element molecules excited by said beam, with said host substance molecules,  
wherein ~~characterized in that~~ said source of excitation is a type II quantum well laser.
12. (Currently Amended) A device ~~Device~~ for detecting by photoexcitation, a  
chemical element in a host substance comprising:
- a source of optical excitation consisting of a semi-conductor laser which, in the direction of ~~the~~ a sample of said substance, emits a beam of light, the wavelength of which, located in the mid infrared, corresponds to an absorption band specific to said element; and
  - ~~the~~ a means for detecting and measuring the heating effects of the host substance, resulting from the

interaction of the element molecules excited by said beam, with said host substance molecules,  
~~wherein characterized in that~~ said source of excitation is a type II quantum cascade laser.

13. (Currently Amended) A device ~~Device~~ for detecting by photoexcitation, a chemical element in a host substance comprising:
- a source of optical excitation consisting of a semiconductor laser which, in the direction of ~~the~~ a sample of said substance, emits a beam of light, the wavelength of which, located in the mid infrared, corresponds to an absorption band specific to said element; and
  - ~~the~~ a means for detecting and measuring the heating effects of the host substance, resulting from the interaction of the element molecules excited by said beam, with said host substance molecules,  
~~wherein characterized in that~~ said source of excitation is a quantum well laser using materials with low forbidden band energy.